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Hardwood Price Reporting

Brent L. Sohngen and Richard W. Haynes

Authors

BRENT L. SOHNGEN is a graduate student, Yale University School of Forestry and Environmental Studies, New Haven, Connecticut 06510; and RICHARD W. HAYNES is a research forester, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, P.O. Box 3890, Portland, Oregon 97208-3890.

Abstract

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Prices for red alder (*Alnus rubra* Bong.) hardwood logs are published and analyzed for reliability, consistency, and robustness. Timberland managers can use these prices to make decisions about land management. They show that values for red alder logs have been increasing steadily for the last 11 years.

Keywords: Hardwood, hardwood prices, red alder, *Alnus rubra*, stumpage.

Summary

For years, red alder has been considered a weed species in the Pacific Northwest, and resource timberland managers have attempted to eradicate it in many different ways. Our concern here is that prices traditionally have not played their economic role in signaling timberland managers and owners that red alder is a valuable tree species that can be managed for productive and profitable uses.

By publishing price information collected over the last 12 years by the Washington Department of Natural Resources and the Oregon Department of Forestry, and by testing those prices against data collected from mills, we hope to provide information that is reliable, consistent, and robust. This information will give managers a valuable and accurate tool for assessing the value of hardwood timber.

Contents

Introduction

Since 1985, the hardwood lumber industry has grown considerably in the Pacific Northwest. Both lumber production and the price of hardwood logs have increased (Ekstrom 1992). Despite this growth, however, accurate information concerning the value of hardwood stumpage, particularly for red alder (*Alnus rubra* Bong.), is not available to forest managers. Consequently, forest managers and landowners may not realize the economic value of hardwoods, such as red alder, and thereby continue to eradicate rather than manage hardwoods.

Historically, in the Pacific Northwest timber industry, red alder has maintained the problematic image of a weed species. When there were limited markets for red alder logs, policy often dictated that the species be eradicated, as red alder was occupying higher value softwood sites (Plank and others 1990). Now, though, a viable market for hardwood logs exists throughout the west side of the Washington and Oregon Cascade Range, and observers believe that the industry will continue to grow (Ekstrom 1992).

Since 1983, hardwood lumber production in western Washington and Oregon has doubled, from 179 to 361 million board feet in 1991. With such a growing domestic market for hardwood logs (and log exports), many people in the industry are concerned about the future supply of logs. The combination of growing demand with the lack of price information has led to perceived shortrun and longrun supply shortages. Landowners, not realizing the value of red alder, have contributed to this shortage because they see no incentive to either manage or market it.

From an economic perspective, the most important role of the price of a free market good is that it will provide accurate data for producers and consumers so that the market will equilibrate; that is, producers would offer the amount that consumers are willing to purchase. Without accurate price information, markets quickly fall into disarray.

This study has been motivated by concerns over whether timberland managers or owners have had the necessary information to make rational decisions about hardwoods. Little red alder is sold as stumpage, and the prices we found relate to the domestic delivered log market. Although we will not examine it here, a vigorous export market for high-quality red alder logs does exist in the Pacific Northwest (see Warren 1992 for related statistics). In this paper, we attempt to develop an accurate price series on domestic, delivered red alder logs in the Pacific Northwest Region (PNW). Efforts to include other species failed because little industry-level information is available.[1]

By using statistical methods, we will show that data obtained from the Washington Department of Natural Resources and the Oregon Department of Forestry are the closest available representations of actual market conditions. This conclusion requires testing different time series against one another to satisfy the conditions of reliability, consistency, and robustness. We also intend to look for indications of seasonality and long-term trend. The goal is to find a reliable price series that can be published regularly in the publication "Production, Prices, Employment, and Trade in Northwest Forest Industries" (Warren 1992).

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[1] Although no effort was made to test the prices of maple, we included information obtained from the Washington Department of Natural Resources in the appendix. These prices are the delivered log prices of maple in Washington.

Data Collection

After we contacted Federal agencies responsible for managing public lands, it became apparent that the information collected by the U.S. Department of Agriculture, Forest Service, and the U.S. Department of the Interior, Bureau of Land Management (BLM), concerning stumpage prices was subject to statistical bias. Forest Service sales are predominately conifer and, as such, they are based on the major species in the sale, usually conifer. Stumpage prices reported for red alder are assigned arbitrary values (according to the timber sales staff at the Regional Office).

State agencies, such as the Washington Department of Natural Resources (DNR) and the Oregon Department of Forestry (ODF), collect information by surveying mills to determine list prices for logs (see appendix A for information about data-collection methods). The Washington DNR surveys mills monthly, whereas the ODF reports prices quarterly. Both agencies segment their respective states by regions. In Washington, the DNR subdivides the state into five regions: Northwest, South Puget, Olympic, Central, and Southwest. In Oregon, the ODF places northwest Oregon and the Willamette Valley in one region, and Coos, Curry, and Douglas Counties in a second region.

In addition to public agencies, individual mills also provided summaries of their monthly average values for logs purchased. Six mills (four in Oregon and two in Washington) cooperated, thereby providing information for both states. Two private reporting services were a final source of information: Log Lines reporting service (Arbor-Pacific Forestry Services 1992),[2] and the Pacific Rim Log and Wood Market Reports (PRWMR) (Gruenfeld and Association 1987-88, 1989-92).

The appendices to this paper contain a description of the data-collection method and the tables of the DNR and ODF data. Although the data sets include prices from 1980 to 1992, no conclusions should be drawn on the reliability, consistency, and robustness of prices before 1987 for Oregon and before November 1985 for Washington. We are able to obtain actual mill data for only those years to the present. Information from Log Lines or PRWMR can be obtained by contacting those services directly (see "Literature Citations").

Method

The initial objective of this study was to analyze the data for reliability, consistency, and robustness. We also examined the issues of trend and seasonality in the data. The tests for reliability, consistency, and robustness were carried out in nominal dollars; that is, those not adjusted for inflation. Trend and seasonality, however, were analyzed by using real, or deflated dollars, because it is important to remove the effects of inflation when dealing with these two issues. Prices were deflated by using the producer price index from the Survey of Current Business (U.S. Department of Commerce, Bureau of Economic Analysis 1989, 1992).

To date, no studies dealing specifically with the price of red alder logs or stumpage have been done. A review of the literature revealed that few studies exist that test a single price series for the objectives above. Mills (1927) presents the first in-depth price analysis. Soon after, Warren and Pearson (1933) explore long-term trends,

[2] The use of trade or firm names in this publication is for reader information and does not represent an endorsement by the U.S. Department of Agriculture of any product or service.

cyclical behavior, and price stability. In the 1950s and 1960s, agricultural economists dealt mostly with price information to model market behavior. More recently, interest has stirred on imperfect markets and the responsiveness of industrial prices to market conditions (for example, Blinder 1991), but this literature compares price-setting policies across industries.

Competitive markets are defined by four basic conditions: (1) no outside coercion exists; (2) markets exist; (3) no particular firm has market power; and (4) buyers and sellers are anonymous in that buyers do not care who the sellers are. For this study, several basic assumptions allow us to suggest that these conditions are met for the hardwood industry in the Pacific Northwest. First, we assume that prices obtained from the producers are representative of typical firms in the industry. Second, we assume that all producers have access to the same information, thereby ensuring equality among the firms. The third assumption is that both the actual data and the surveyed information come from the same population.[3] These free market assumptions are necessary for comparing different price series. We will return to the assumption of competitive markets in the conclusion.

There are a few considerations that prevent comparing the hardwood and softwood industries directly. First, the hardwood industry in the Pacific Northwest is relatively new with little having been done to study the market structure. Second, the data can be classified as quoted prices and not actual market transactions; thus, we do not get a sense for the relative variations in quantity. Third, the length of the time series is limited by the nature of the industry. Hardwood information for years before 1987 is poor. Although the DNR and ODF collected information before 1987, the mills themselves have not retained similar information. Prices before 1987 from these two sources are given in appendix A.

These assumptions and limitations suggest that looking for reliability, consistency, and robustness in the data will provide a sound basis for comparing the different sources of price information. Reliability and consistency imply that the information from the DNR and ODF represents actual market conditions. At each point in time, then, the surveyed price data should approximate the data from actual producers.

We used tests of hypothesis to determine whether the means of the surveyed data sets are significantly different from those of actual producers.[4] To accomplish this, we produced a third data set consisting of the difference between two data sets at each observation (a point in time). The mean of the third data set was then tested to determine if it is significantly different from zero. If the surveyed data and the actual data are truly from the same population, as our hypothesis suggests, then the mean of the third data set should be zero. This hypothesis can be statistically tested with standard *t*-tests.

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[3] Population is used in a statistical sense. We assume that the price series used in the paper (that is, the DNR, ODF, producer average values, and market reporting services) are sampled data from the entire population of hardwood log prices. Hence, they should convey similar information.

[4] To avoid a potential breech of trust in gathering the producer price information, we do not reveal the producer prices. The results of the *t*-tests and *F*-tests are shown in table 1. Any further information regarding the tests can be obtained by contacting the authors.

For purposes of this study, robustness was defined as the ability of the price series to reflect accurately the changes in market conditions over time. Although this criteria suggests that only full knowledge of quantities and prices can reveal the accuracy of a price series, by using certain statistics, we can compare the available data sets to determine if they convey the same information. We used the coefficient of variation[5] (coeff), the proportion of months in which there was a change, and the relative size of the changes as comparative statistics (Mills 1927).

This definition of robustness implies that a price series has period-to-period (that is, month-to-month) as well as long-term movements that reflect observed behavior in the market. Under the assumptions above, the surveyed time series from the DNR and ODF, as well as the private sources, should display similar behavior as data from the actual producers. In spite of our assumption that all time series come from the same population, we often see that two different series have prices changing in different directions from one month to the next. This study attempted to quantify these differences between price series by comparing the variability in period-to-period changes.

Being concerned with changes from period to period, we investigated the first differences, the price at time t minus the price at time t-1, P(t)-P(t-1). For the surveyed data to be considered adequate proxies for actual producer prices, the three statistics mentioned above should be similar to the actual producers, and their variances should not be significantly different. An *F*-test will determine whether the variances of the first differenced series are the same.

By using the method employed by Haynes (1991), we examined the issue of seasonality in the data. Individuals involved with the industry maintain that logs are more difficult to obtain in the winter months owing to logging conditions. As for the long-term trend, the perception by many is that prices have been increasing steadily and will continue to increase. We used regression analysis of the price series on a constant and the date, and test of significance on the coefficients, to determine if an increasing trend is found in the data.

Results

Reliability and Consistency

Figure 1 shows the differences in price among actual producers in Oregon and Washington; hypothesis testing about the mean of the prices suggests that they are not the same at each date. The results of the hypothesis testing are given in table 1. All data sets (PRWMR, Log Lines, DNR, ODF, and actual producers) reveal that Oregon prices are statistically greater than Washington prices. For this reason, prices from both Washington and Oregon are reported in appendix B.

With the DNR data in Washington, we further found a significant difference in prices from each of the surveyed regions. The PRWMR data reveal, however, that there is no significant difference between its reported Southwestern-Coastal Washington region and Northwestern Washington region (there is a difference in the way that PRWMR and DNR divide the State). Because most mills in Washington are in the Southwest and Central regions, and because of data limitations, we used DNR prices from only those two regions in our analysis. Further, any reference to PRWMR data refers only to the Southwest Washington region.

[5] The coefficient of variation (coeff) is the ratio of the standard deviation to the mean, or average of the time series. It represents a relative measure of the variability in a data set and is used here only to compare time series.

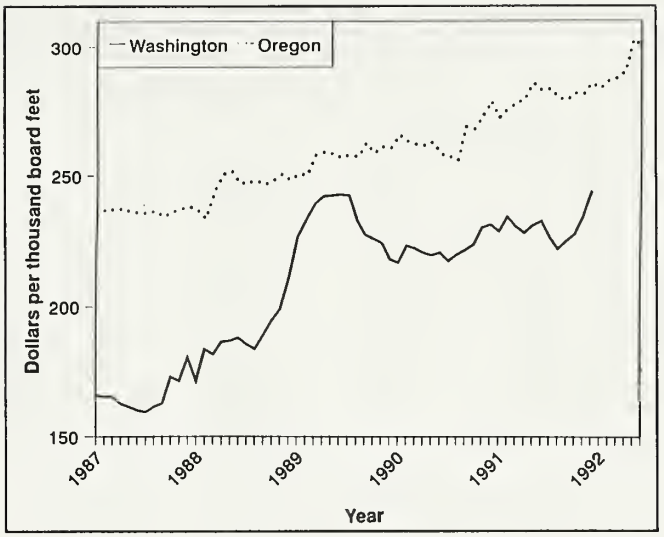

Figure 1—Nominal red alder saw-log monthly prices, averaged for the producers who reported prices in each state, January 1987-June 1992.

The tests of hypothesis about the mean of the DNR data set and the actual producer prices reveal a significant difference between the two. The DNR price is higher than the "camp run"[6] price reported by mills. When we compared the other two surveyed data sets (Log Lines and PRWMR), there was a significant difference between their means and that of the actual producer.

The ODF data allow rejection of the hypothesis that Northwest Oregon-Willamette Valley and Southern Oregon (Coos, Curry, and Douglas Counties) have had the same prices over time. The other reporting services do not divide Oregon into separate regions. We have chosen to use the data from Northwest Oregon-Willamette Valley regions, as most Oregon mills are located in these counties, and we obtained actual producer data from this region. When comparing the different data sets, we find a significant difference between the actual producer prices and the surveyed ODF, PRWMR, and Log Lines prices. The actual producer prices are higher than the prices determined by the ODF.

Robustness

Table 2 reports the statistical results from taking the first differences of the red alder price series in Washington. We compared the average, variance, standard deviation, and proportion of months with a change among the different sources of price information. Although the average for PRWMR is closer to the actual data than the average for the DNR data, the variance, the coeff, and the proportion for the DNR data are all closer to the actual producer. Log Lines clearly has the highest proportion of monthly changes of the surveyed data sets, but its high average, variance, and coeff suggest that its month-to-month changes in price may overstate those in the actual market. As for the sizes of the monthly price changes, most changes of the actual producer range from 0 to 2.9, and the DNR data most closely resemble the distribution of actual producers.

[6] "Camp Run" refers to a mix of logs ranging from high-grade saw logs to pulp logs.

Table 1—Results of *t*-tests and *F*-tests on the available price series

Description[a]	t[b]	F[c]	n1[d]	n2[e]	$t_{a=0.05}$	$F_{a=0.05}$
Washington DNR regions:						
SW-CEN[f]	11.20	—	46	—	2.02	—
SW-OP	8.49	—	47	—	2.02	—
CEN-OP	14.32	—	48	—	2.02	—
Washington PRWMR regions:						
SWC-NWA	–.32	—	63	—	2.02	—
Washington surveyed data vs. producer data:						
DNR-actual	14.14	—	78	—	2.00	—
LOG-actual	–6.64	—	40	—	2.02	—
PRWMR-actual	–3.45	—	63	—	2.02	—
Oregon ODF regions:						
R2-R1	–18.29	—	44	—	2.02	—
Oregon surveyed data vs. producer data:						
ODF-actual	–8.11	—	21	—	2.08	—
LOG-actual	–6.97	—	13	—	2.16	—
PRWMR-actual	–4.59	—	21	—	2.08	—
Oregon prices vs. Washington prices (Oregon-Washington):						
Producers	23.78	—	64	—	2.00	—
PRWMR	16.82	—	51	—	2.02	—
LOG	8.53	—	34	—	2.02	—
ODF-DNR	11.68	—	49	—	2.02	—
F-tests:						
Washington—						
DNR-actual[g]	—	1.06	76	76	—	1.53
LOG-actual	—	16.54	39	76	—	1.59
PRWMR-actual	—	1.96	62	76	—	1.53
Oregon—						
ODF-actual	—	2.59	39	20	—	1.99
LOG-actual	—	20.51	12	20	—	2.28
PRWMR-actual	—	8.34	24	20	—	2.12

[a] SW = Southwest Region of Washington (DNR classification).
CEN = Central Region of Washington (DNR classification).
OP = Olympic-Puget Sound Region of Washington (DNR classification).
SWC = Southwest-Coastal Region of Washington (PRWMR classification).
NWA = Northwestern Washington Region (PRWMR classification).
LOG = Log Lines reporting service.
Actual = Prices from the actual producers in the region.
R2 = Coos Bay Region of Oregon (ODF classification).
R1 = Northwest-Willamette Valley Region of Oregon (ODF classification).

[b] The *t*-test is calculated with the following formula:

$$t = \frac{\bar{x} - \mu}{\sqrt{s^2/(n-1)}}$$

[c] The *F*-test is calculated with the following formula:

$$F = \frac{s_1/(n_1-1)}{s_2/(n_2-1)}$$

[d] n1 are the degrees of freedom for the *t*-test, or the degrees of freedom in the numerator of the *F*-test.

[e] n2 are the degrees of freedom in the denominator of the *F*-test.

[f] For all the *t*-tests, the second series is always subtracted from the first series in this table.

[g] For all *F*-tests, the first series is the numerator and the second series is the denominator.

Table 2—Basic statistics on the first differenced [P(t)-P(t-1)] price series from Washington sources; the data tested ran from November 1985 to May 1992

	Price series			
	Producer[a]	DNR	Log Lines	PRWMR
Average	1.16	1.36	1.68	1.14
Variance	20.97	22.31	102.41	35.54
Standard	4.58	4.72	10.12	5.79
Coefficient[b]	3.94	3.46	6.03	5.06
Proportion[c]	1.00	.82	1.00	.52
Number	77	77	40	63

[a] Producer = Washington producer.
[b] Coefficient = coefficient of variation (standard deviation/average).
[c] Proportion = proportion of months in which there was a change.

When testing for differences in the variances of the first differenced time series, we found no significant difference between the variance of the DNR data and the actual producer. We did find, however, a significant difference between the variance of the Log Lines and the PRWMR data, and the actual producer (results in table 1). Based on the simple comparisons above, and this test of significance, we found that the DNR data are the closest proxies for actual producer data.

Table 3 reports the same statistical results from the first differenced price series in Oregon. The Log Lines data clearly have the closest coeff, whereas the PRWMR data have the closest proportion of months with a change in price to the actual producers. Most of the monthly price changes of the actual producer are small, however, as are those from the ODF. Although the Log Lines data set has a coeff closest to that of the actual producer, its mean change in price for each period is much higher than that of the other data sets. And, where the proportion of months with a change in price in PRWMR is closest to that of the actual data set, it is not appreciably larger than that of the ODF. Many of its monthly price changes are large. When we tested for similarity in variance in the Oregon data sets, we found a significant difference between the variances of the ODF, Log Lines, and PRWMR data, and the actual producers.

Seasonality

The data from Washington mills indicated that seasonality exists. Prices were higher in winter and spring than in summer and fall. The DNR data confirmed this result. Appendix B contains tables with the factors used to remove seasonality from the data, for both Washington and Oregon.

Compared to Washington prices, prices from mills in Oregon did not show seasonality. Quarterly data from ODF suggested, however, some seasonal variation. Prices were higher in quarters one and two than in quarters three and four.

Table 3—Basic statistics on the first differenced [P(t)-P(t-1)] price series from Oregon sources; the data run from 1st quarter 1987 to 2d quarter 1992

	Price series			
	Producer[a]	ODF	Log Lines	PRWMR
Average	2.93	2.63	4.38	3.76
Variance	18.89	95.43	232.51	188.94
Standard	4.35	9.77	15.25	13.75
Coefficient	1.48	3.72	3.48	3.72
Proportion	1.0	0.7	1.00	0.72
Number	21	40	13	25

[a] Producer = Oregon producer.

Long-Term Trend

We found a positive trend in the price of red alder in Washington from January 1986 to April 1992. The coefficient on the explanatory variable was significant at the 0.05 level. Likewise, a positive trend in the price of red alder in Oregon was found. Interestingly, in Oregon, the real price of red alder did not have a positive trend until early in 1991. Since then, prices have been increasing (fig. 2).

Conclusion

Until recently, red alder prices in Washington have been lower than those in Oregon (fig. 3). This situation seems counter-intuitive, as the export market is stronger, and there are more competitive mills in Washington. If prices are driven by supply side issues, however, it may reflect a situation in which it is easier for Washington mills than for Oregon mills to tap the hardwood supply. For example, most hardwood is on private timberland, and there is more of that in Washington.

We conclude from the above results that the Washington DNR data can serve as an adequate proxy for the population of prices in Washington. The six producers in the Southwest and Central regions dominated the Washington market and provided a reliable, consistent, and robust time series. Although month-to-month variation existed in only 78 percent of the cases, the coefficient of variation approximated the coefficient of variation from the actual producer. Further, most monthly price changes in the DNR data set were small, as were those from the actual producers.

The ODF series did not match up to actual producer prices as well as the DNR prices in Washington did. The mean was significantly different; only 70 percent of the periods in the ODF data have changes, and the coefficient of variation is much higher for ODF data than for actual producers. The size of the changes in the ODF are mostly smaller than those of the other data sets. Nevertheless, although the ODF data do not match up as well, they are the best available alternative for inclusion in the quarterly report (Warren 1992).

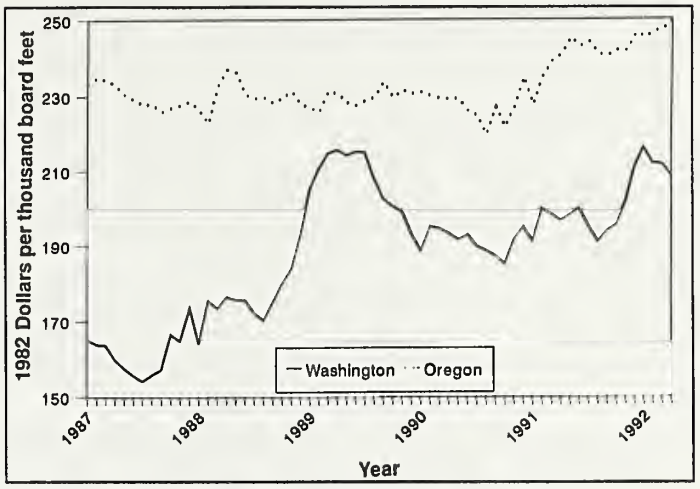

Figure 2—Real red alder saw-log monthly prices, averaged for the producers who reported prices in each state, January 1987-June 1992.

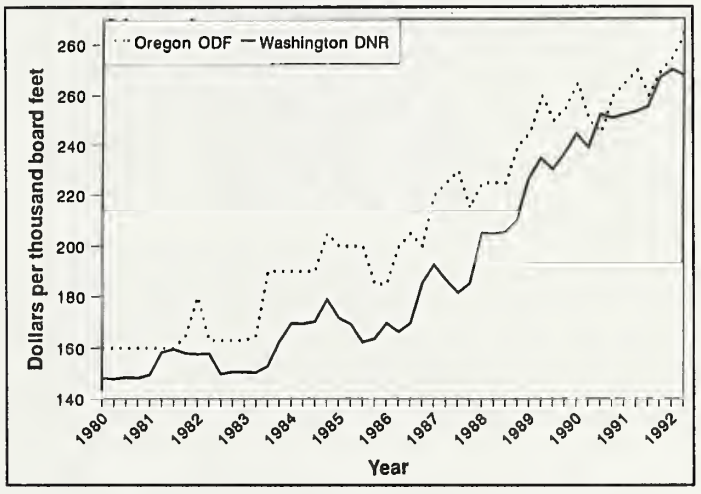

Figure 3—Nominal red alder saw-log prices as collected from the Washington DNR and the Oregon ODF, by quarter within years.

One reason that the Washington DNR data are more reliable, consistent, and robust than the Oregon data is that more hardwood mills exist in the Washington market. Fewer respondents in Oregon contributes to the high variability in the first differenced series.[7]

[7] Personal communication. 1992. Dave Cleaves. USDA Forest Service, Southern Forest Experiment Station, Room T, 10210 U.S. Postal Service Bldg., 701 Loyola Ave., New Orleans, LA 70113.

From the beginning, the assumption that hardwood markets are freely competitive allowed us to test the time series against one another by suggesting that all price series come from the same population. Although many industry observers suggest that the markets are not competitive, we found no evidence contrary to our assumptions. One trait of imperfect price setting is that prices do not move for months at a time. We found, however, that prices are robust. Although mills may not change their list prices for a few months at a time, their average log price of all grades changes frequently. We feel confident about our assertion of competitive markets in the hardwood industry of the Pacific Northwest.

Another argument often raised against market competitiveness is that there is a lack of information in the market. Although the prices are behaving as one would expect in competition, there certainly is a lack of information. Presently, timberland owners and managers know little about the prices of red alder in the delivered log market. This problem stems both from the lack of a stumpage market for red alder and the fact that most red alder are the by-products from large conifer sales.

Results from analysis of seasonality and trend provided mixed indications about predictions based on information received from people actually involved in the industry. In Washington, results from both the actual producers and the DNR confirmed that seasonality is a factor in the market, and that prices will tend to be higher in winter. Although data from actual producers in Oregon do not confirm our prediction, the ODF price series does. One possible explanation for the mixed results in Oregon is that the State has only a few mills actually purchasing logs, which could reduce winter month competition. A second explanation is that the overall higher prices in Oregon reduce profit margins such that mills cannot pay higher premiums for logs in the winter.

Results indicated an increasing trend in the price of hardwood logs since 1987 in both Washington and Oregon. In Washington, the real price has increased steadily since late 1985. The situation is somewhat different in Oregon. There was no trend in the actual producers price from January 1987 to December 1990. Since January 1991, however, real prices from actual producers have been increasing (fig. 3). The ODF data likewise show an increasing trend since 1985 in the real price.

With a growing industry, increased information, and higher prices, better land management decisions concerning red alder should occur. Rather than the eradication and early cutting practices of the past, private timberland owners should be more willing to manage for red alder sawtimber. We hope managers will recognize the potential for supporting the industry by developing silvicultural techniques for better quality stumpage.

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Appendix A
Data Collection

Six mills reported their monthly average log prices to us. Due to agreements of confidentiality, however, we will not publish that information here. The prices obtained from the Washington DNR and the Oregon ODF are the results of phone surveys by those agencies to the mills in their respective states.

The Washington DNR reports the prices quoted by each mill, for the grades that they purchase. Although the mills quote separate prices for differing qualities, discussions with log buyers and managers indicate that the actual market is for "camp run" material: that is, a load of logs will contain many different quality or size classes, and the mill will pay an average price accordingly.

To rectify this difference between the prices mills report to the DNR and the way the market operates, we assume a "camp run" price for each mill by taking the simple average of all prices reported for the sawtimber log grades. For example, if a mill reports quoted prices for grades 5, 6, 7, 8, 9, and pulp for any given year, we average the values of 5, 6, 7, and 8 to determine its "camp run" price. Our reported prices for the DNR are this "camp run" value. The reported pulp prices are for grades 9 and above.

The situation in Oregon is somewhat different. The ODF reports only a "camp run" and a pulp price, not a price for separate grades. Both of these represent an average of the highest 75 percent of prices from the mills reporting. The ODF uses only the top 75 percent so that they can remove some of the bias from mills, which may intentionally report low prices. Interestingly, the prices of actual mills are still higher than those reported to the ODF. This caveat may, of course, introduce other bias into the data and should be noted when using the time series. We use only the "camp run" prices from the Oregon data, as these prices correlate most closely to the data received from the mills.

We will not attempt to make the same transformation with the Washington data. There is no reason to suspect that mills in Washington will intentionally report prices lower than they actually pay. In fact, the DNR sawtimber prices are already higher than the actual mill prices. Using only the top 75 percent would further bias the prices upward.

Appendix B
Data Tables

Table 4—Historical monthly nominal red alder log prices compiled from Washington Department of Natural Resources data

	Year											
Month	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
January	139.52	140.06	150.84	145.43	159.68	163.93	163.01	182.48	194.49	210.87	238.00	239.06
February	144.76	138.94	148.84	146.18	159.68	161.30	163.01	181.69	194.49	216.09	240.75	241.47
March	143.39	150.09	150.97	146.05	160.05	163.55	161.71	181.07	195.91	221.32	233.35	247.64
April	143.64	151.09	150.97	145.93	160.05	162.60	154.86	181.82	194.04	223.47	227.48	242.22
May	143.51	151.09	151.22	145.43	157.83	162.60	159.99	177.19	197.54	223.47	221.60	243.56
June	141.89	154.59	150.39	145.30	161.43	157.73	160.97	175.19	197.80	223.47	226.75	239.89
July	140.51	155.59	150.39	146.18	159.49	157.48	160.97	174.82	197.86	222.70	226.75	239.89
August	143.43	152.01	141.64	146.68	159.49	155.85	160.97	173.19	197.86	221.08	233.25	239.89
September	142.80	151.01	141.80	149.05	164.89	155.85	160.97	173.19	198.61	219.45	238.39	238.47
October	142.80	148.51	146.43	153.93	168.89	155.79	171.44	174.07	199.61	232.53	238.56	244.58
November	142.59	150.84	144.93	154.43	168.14	155.79	173.54	175.81	201.86	227.63	238.76	245.75
December	140.06	150.84	144.93	154.43	169.99	156.91	178.04	180.18	205.21	211.31	238.76	248.25

Source: Washington Department of Natural Resources.

Table 5—Historical monthly real red alder log prices compiled from Washington Department of Natural Resources data

	Year											
Month	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
January	163.76	147.12	151.30	145.14	155.18	158.58	158.00	181.57	185.93	190.83	207.13	199.88
February	166.58	144.57	149.14	145.45	154.73	156.24	160.33	180.01	185.58	195.03	210.44	206.03
March	163.87	154.74	151.58	145.47	154.04	158.68	161.23	179.10	186.76	198.49	204.34	213.11
April	163.59	154.18	151.58	145.35	153.90	157.40	155.48	178.48	183.40	198.99	199.37	208.81
May	162.53	153.71	151.52	144.27	151.62	157.14	160.09	172.75	185.48	197.41	193.37	209.06
June	159.96	156.95	150.39	143.86	155.22	152.73	161.18	170.19	184.57	197.93	198.38	206.09
July	155.60	157.17	149.79	144.30	153.06	152.59	162.05	168.95	183.38	197.43	198.03	206.62
August	156.75	153.55	141.21	144.08	153.65	151.85	162.16	166.95	183.21	197.39	200.21	206.44
September	155.73	152.84	141.80	146.13	159.46	152.59	161.89	167.06	183.73	195.41	201.51	205.58
October	153.88	150.16	146.13	150.61	163.33	151.44	172.08	167.36	184.48	206.33	197.48	210.12
November	153.00	152.68	144.49	151.25	162.14	150.60	173.95	168.76	186.39	201.98	198.80	211.13
December	149.32	152.68	144.21	150.96	164.25	151.45	178.82	173.07	188.27	187.00	201.32	214.19

Source: Washington Department of Natural Resources.

Table 6—1992 red alder log prices for the State of Washington, compiled from the Department of Natural Resources

Month	Nominal prices	Real prices (1982)
January	248.25	214.75
February	248.25	213.82
March	248.92	214.40
April	248.92	214.03
May	252.04	

Table 7—Quarterly red alder log prices

Year	Quarter	Nominal prices		Real prices (1982)	
		ODF	DNR	ODF	DNR
1980	1st	160.00	142.56	184.90	164.74
	2d	160.00	143.01	181.27	162.02
	3d	160.00	142.25	175.50	156.03
	4th	160.00	141.82	171.55	152.06
1981	1st	160.00	143.03	166.49	148.83
	2d	160.00	152.26	162.82	154.95
	3d	160.00	152.87	161.73	154.52
	4th	165.00	150.07	166.95	151.84
1982	1st	180.00	150.22	180.54	150.67
	2d	163.00	150.86	163.33	151.16
	3d	163.00	144.61	162.62	144.27
	4th	163.00	145.43	162.46	144.94
1983	1st	163.00	145.89	162.40	145.35
	2d	165.00	145.55	163.80	144.49
	3d	190.00	147.30	186.82	144.84
	4th	190.00	154.26	185.91	150.94
1984	1st	190.00	159.80	183.87	154.65
	2d	190.00	159.77	182.63	153.58
	3d	190.00	161.29	183.04	155.38
	4th	205.00	169.00	198.00	163.24
1985	1st	200.00	162.93	193.75	157.83
	2d	200.00	160.98	193.52	155.76
	3d	200.00	156.39	194.82	152.34
	4th	185.00	156.16	179.08	151.16
1986	1st	185.00	162.58	181.88	159.84
	2d	200.00	158.60	200.40	158.92
	3d	205.00	160.97	206.36	162.03
	4th	200.00	174.34	200.69	174.95
1987	1st	220.00	181.75	218.15	180.22
	2d	225.00	178.07	219.60	173.79
	3d	230.00	173.74	211.95	167.65
	4th	215.00	176.69	206.54	169.73
1988	1st	225.00	194.96	214.76	186.09
	2d	225.00	196.48	211.27	184.49
	3d	225.00	198.11	208.33	183.44
	4th	240.00	202.23	221.20	186.39
1989	1st	245.00	216.09	220.85	194.80
	2d	260.00	223.47	230.50	198.11
	3d	250.00	221.08	222.49	196.74
	4th	255.00	223.83	226.06	198.43
1990	1st	265.00	237.37	231.44	207.31
	2d	250.00	225.28	218.66	197.04
	3d	245.00	232.80	210.42	199.94
	4th	260.00	238.69	216.97	199.19
1991	1st	265.00	242.72	225.21	206.28
	2d	270.00	241.89	232.16	207.99
	3d	260.00	239.42	223.94	206.22
	4th	270.00	246.19	232.29	211.81
1992	1st	275.00	248.47	237.21	214.32
	2d	285.00	250.48	245.06	215.37

Source: Washington Department of Natural Resources.

Table 8—Factors used to deseasonalize red alder log prices; the deseasonalized price can be found as such: real price divided by factor = deseasonalized price

Washington DNR	
Month	Factor
January	1.033
February	1.035
March	1.028
April	1.013
May	.995
June	.995
July	.988
August	.986
September	.982
October	.988
November	.986
December	.975
Oregon ODF	
Quarter	Factor
1	1.006
2	1.015
3	.991
4	.988

Table 9—Historical monthly nominal maple log prices compiled from Washington Department of Natural Resources data

	Year												
Month	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
January	122.50	130.63	156.25	143.13	133.13	132.42	135.83	147.92	148.50	132.50	172.50	190.00	201.67
February	130.00	130.63	156.25	143.13	133.13	127.42	139.17	151.25	148.50	139.75	172.50	190.00	201.67
March	131.88	135.00	156.25	143.13	133.13	130.33	139.17	149.17	145.25	145.00	172.50	190.00	210.00
April	130.63	138.75	156.25	143.13	133.13	130.33	139.17	145.83	145.25	144.75	172.50	190.00	210.00
May	130.63	138.75	156.25	143.13	133.13	130.33	139.17	142.50	137.50	144.75	172.50	190.00	210.00
June	130.63	148.13	156.25	143.13	134.38	129.50	139.17	142.50	137.50	144.75	190.00	190.00	
July	130.63	148.13	156.25	135.63	128.67	127.83	139.17	142.50	137.50	144.75	190.00	190.00	
August	130.63	148.13	142.50	135.63	131.33	127.83	139.17	142.50	137.50	144.75	190.00	190.00	
September	121.88	148.13	142.50	135.63	131.33	127.83	139.17	142.50	140.00	172.50	190.00	190.00	
October	121.88	148.13	143.13	135.63	135.33	127.83	147.08	142.50	140.00	172.50	190.00	201.67	
November	121.88	148.13	143.13	133.13	135.33	127.83	147.08	145.83	140.00	172.50	190.00	201.67	
December	121.88	148.13	143.13	133.13	132.42	127.83	147.83	145.83	140.00	172.50	190.00	201.67	

Table 10—Historical monthly real maple log prices compiled from Washington Department of Natural Resources data

	Year												
Month	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
January	143.78	137.21	156.72	142.84	129.37	128.10	131.66	147.18	141.97	119.91	150.13	158.86	174.45
February	149.60	135.93	156.56	142.41	129.00	123.42	136.88	149.85	141.70	126.13	150.79	162.12	173.70
March	150.71	139.18	156.88	142.55	128.13	126.45	138.75	147.54	138.47	130.94	151.05	163.51	180.88
April	148.78	141.58	156.88	142.55	128.00	126.16	139.73	143.16	137.29	128.90	151.18	163.79	180.57
May	147.93	141.15	156.56	141.99	127.88	125.96	139.26	138.93	129.11	127.87	150.52	163.09	180.57
June	147.27	150.38	156.25	141.71	129.21	125.40	139.35	138.43	128.26	128.21	166.23	163.23	
July	144.66	149.62	155.63	133.88	123.48	123.86	140.10	137.72	127.43	128.32	165.94	163.65	
August	142.76	149.62	142.07	133.23	126.53	124.55	140.20	137.36	127.31	129.24	163.09	163.51	
September	132.91	149.92	142.50	132.97	127.01	125.16	139.96	137.45	129.51	128.90	160.61	163.79	
October	131.33	149.77	142.84	132.71	130.88	124.26	147.63	137.01	129.39	153.06	157.28	173.25	
November	130.77	149.92	142.70	130.39	130.50	123.58	147.43	139.99	129.27	153.06	158.20	173.25	
December	129.93	149.92	142.41	130.13	127.94	123.38	148.56	140.08	128.44	152.65	160.20	174.00	

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Prices for red alder (*Alnus rubra* Bong.) hardwood logs are published and analyzed for reliability, consistency, and robustness. Timberland managers can use these prices to make decisions about land management. They show that values for red alder logs have been increasing steadily for the last 11 years.

Keywords: Hardwood, hardwood prices, red alder, *Alnus rubra*, stumpage.

Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, Oregon 97208-3890

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U.S. Department of Agriculture
Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, OR 97208